absence of combined nitrogen, a definite amount of combined nitrogen was supplied in the medium. The full nutrient solution employed contained 0.5 gr. NH_4NO_3 per liter and in the various series this source of nitrogen was replaced by $(NH_4)_2SO_4$, $Ca(NO_3)_2$, asparagine, glycocoll, and urea, the other constituents of the solution remaining unchanged. In all the culture media nitrogen as such was present in approximately equal quantities and each nitrogen source was set up in duplicate series, with and without 1 per cent. glucose. NH_4NO_3, $Ca(NO_3)_2$, and $(NH_4)_2SO_4$ were also used in the presence of mannite. The culture flasks were arranged in series according to the medium and connected by glass and rubber tubing for aeration with ammonia-free air. Three flasks of each series remained uninoculated as checks and two or three flasks in each series were inoculated with the same organism.

At the end of a growing period of from five to seven months the cultures were analyzed for total nitrogen. The Gunning-Kjeldahl method was used for media free from nitrates and where nitrates were present the Förster modification was employed. The average of the determinations of the three checks of a series was taken as the nitrogen content of that medium per unit weight, and any increase in total nitrogen in the culture flasks of that series was regarded as "free nitrogen fixation." In the urea, glycocoll, asparagine, and $(NH_4)_2SO_4$ series no marked increase or decrease occurred either in the presence or absence of glucose or mannite. Marked increases were found, however, in both NH_4NO_3 and $Ca(NO_3)_2$ media in the presence of glucose, the amount of fixation ranging from 6 to 10 mg. per culture in the 1917–18 experiments and from 4 to 13 mg. in the 1919 experiments. Since the initial nitrogen content of the medium was but 22 or 23 mg. per culture, as shown by the checks, this fixation represents an increase in total nitrogen ranging from 17 to 55 per cent. Where mannite replaced glucose in the nitrate media, there was no indication of fixation; and in the absence of both glucose and mannite, there were only slight increases over the checks. Fixation was not confined to any one species, apparently all seven species showing ability to use free nitrogen. The amount of fixation, however, varied somewhat with the different species and seemed to be related to the intensity of growth.

One species of the 1919 experiment exhibited what is apparently a "denitrification" when grown on nitrate media in the presence of mannite. The total nitrogen content of these flasks was from 2 to 9 mg. below that of the checks. However, the same species in the presence of glucose increased the total nitrogen content of the culture. There was also a slight indication of denitrification with this species on nitrate media in the absence of both glucose and mannite.

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AMERICAN PHYSIOLOGICAL SOCIETY

REPORT OF THE THIRTY-SECOND ANNUAL MEETING

The American Physiological Society held its thirty-second annual session during the holidays at Cincinnati, Ohio. The scientific and business sessions were called at the school of medicine of the University of Cincinnati. Six half-day sessions were held on December 29, 30 and 31, 1919, for the reading and discussion of scientific papers. In the two business sessions a number of important measures were considered and voted, the most notable of which was the establishment of a new journal for the publication of periodical reviews of physiological progress in subjects of dominant scientific interest.

The important business acts of the council and of the society at the several sessions during the meeting are here enumerated:

1. The annual assessment was fixed at $1.00 for the year 1920.

2. A grant of $125 was made in aid of the publication of the journal, *Physiological Abstracts*, edited by the English Physiological Society in which the American Physiological Society is a collaborator.

3. Professor Donald R. Hooker, of Johns Hopkins University, was appointed managing editor of

The American Journal of Physiology for the year 1920. The society passed a vote of appreciation to Dr. Hooker in recognition of his successful management of the *Journal* since the administration of the *Journal* has been under the control of the society.

4. Professor William H. Howell, of Johns Hopkins University, was nominated as representative of the society on the Medical Division of the National Research Council for the three-year term beginning July 1, 1920.

5. The society at its thirty-first annual meeting at Baltimore, April, 1919, voted approval of a proposition by the council to establish a new journal under the auspices of the society for the publication of reviews of timely topics in the physiological sciences. At the present meeting the perfected plan was announced. It was voted to launch the new journal under the control of the American Physiological Society. A tentative board of seven editors was chosen to represent the biological field of the different societies constituting the American Federation of Biological Societies. Dr. Donald R. Hooker was appointed managing editor for the year 1920, and the sum of $3,000 was set aside from the surplus funds of the *American Journal of Physiology* to guarantee the initial expenses of the new journal. The board of editors announced by the council include four members from the Physiological Society and one each from the Biochemical, Pharmacological and Pathological Societies. The list follows:

Wm. H. Howell, The Physiological Society, Johns Hopkins University.

J. J. R. Macleod, The Physiological Society, University of Toronto.

Frederic S. Lee, The Physiological Society, Columbia University.

Donald R. Hooker, The Physiological Society, Johns Hopkins University.

L. B. Mendel, The Society of Biological Chemists, Yale University.

Reed Hunt, The Society of Pharmacologists and Experimental Therapeutics, Harvard University.

H. Gideon Wells, The Society for Experimental Pathology, University of Chicago.

6. The following new members were nominated by the council and elected by the society at the two business sessions:

Joseph C. Aub, A.B., M.D., instructor in physiology, Harvard Medical School, Boston, Mass.

Francis M. Baldwin, A.B., A.M., Ph.D., associate professor of zoology, Iowa State College, Ames, Iowa.

Stanley R. Benedict, A.B., Ph.D., professor of chemistry, Cornell Medical College, New York City.

Felix Chillingworth, M.D., assistant professor of physiology and pharmacology, Yale University, New Haven, Conn.

Isabelo Conception, M.D., assistant professor of physiology, University of the Philippines, P. I. Care War Department, Insular Bureau, Washington, D. C., for 1920.

Chas. H. O'Donoghue, B.Sc., D.Sc., professor of zoology, University of Manitoba, Winnipeg, Canada.

Nathan B. Eddy, M.D., lecturer in physiology, McGill University, Montreal, Canada.

Andrew C. Ivy, Ph.D., professor in physiology, Loyola University, Chicago, Ill.

Merkel Henry Jacobs, A.B., Ph.D., assistant professor of zoology, University of Pennsylvania, Philadelphia, Pa.

Theophile K. Kruse, A.B., A.M., Ph.D., assistant professor of pharmacology, University of Pittsburgh, Pa.

Spencer Melvin, M.D., professor of physiology, Queen's University, Kingston, Ontario, Canada.

Walter R. Miles, A.B., A.M., Ph.D., research psychologist, Nutrition Laboratory, Carnegie Institution, Boston, Mass.

Lillian Mary Moore, B.S., M.S., Ph.D., instructor in physiology, University of California, Berkeley, Calif.

Andrew Theodore Rasmussen, A.B., Ph.D., associate professor of neurology, University of Minnesota, Minneapolis, Minn.

John Tait, M.D., D.Sc., professor of physiology, McGill University, Montreal, Canada.

Geo. A. Talbert, B.S., assistant in physiology, University of Chicago, Chicago, Ill.

Homer Wheelon, A.B., M.S., M.D., assistant professor of physiology, St. Louis University School of Medicine, St. Louis, Mo.

7. The officers elected by the society for the year 1920 are:

President, Warren P. Lombard, University of Michigan.

Secretary, Charles W. Greene, University of Missouri.

Treasurer, Joseph Erlanger, Washington University.

Councillor for the 1920–23 term, Carl J. Wiggers, Western Reserve University.

8. Article IX. of the Constitution was amended to enable the society to control and publish jour-

nals other than the *American Journal of Physiology*. The amended article reads:

Article 1, Section 1. The official organs of the society shall be the *American Journal of Physiology* and such other journals as the society shall from time to time establish. These the society shall own and manage.

Section 2. The management of the journals shall be vested in the council. The council shall make a full report to the society at each annual meeting on the financial condition and the publication policy of the journals.

9. The following resolutions were passed:

(1) That this society concurs in the opinion that the present multiplicity and duplication of work in respect to abstracts of the literature in its field is unsatisfactory.

That we are in general sympathy with the effort along the general lines suggested by the Concilium Bibliographicum to simplify and coordinate such work on an international basis in respect to lists of titles and brief abstracts, while retaining to each national society complete freedom in respect to publications in the fields of review and critique.

(2) That the Council of the American Physiological Society extends its very great appreciation of the hospitality of the Daniel Drake Society which contributed so largely to the pleasures and convenience of the members at the council meetings.

(3) That the cordial thanks of this society be extended to the authorities of the University of Toronto and to its local committee for their invitation to meet at Toronto at the present time and for their preparations for such meeting, which unforeseen circumstances prevented; that it is the hope of this society that another and early opportunity may be given to meet at the University of Toronto.

(4) That the American Physiological Society hereby expresses its very great appreciation of the courtesy and hospitality extended to its members and guests by the officers and faculty, and particularly by the local committee, of the college of medicine of the University of Cincinnati which have gone far to make this meeting an unusual success.

SCIENTIFIC PAPERS

The society met in joint session with the American Federation of Biological Societies for two of its six scientific meetings and one very profitable demonstration session was held on the second afternoon. The program which follows contains 58 papers that were read and discussed beside 19 papers announced by title only.

SCIENTIFIC PAPERS

Observations on the physical efficiency tests used by the Royal Air Force of England: Edward C. Schneider, Wesleyan University.

Observations on the distribution of glycogen in some invertebrates and fishes: J. J. R. Macleod, L. Kilborn and R. S. Lang, University of Toronto.

Further observations on ether hyperglycemia in the absence of the adrenals: G. N. Stewart and J. M. Rogoff, Lakeside Hospital, Cleveland.

Further observations on the relation of the central nervous system to epinephrin secretion: G. N. Stewart and J. M. Rogoff.

The etiology of ricketts: E. V. McCollum.

The rôle of fat soluble vitamine in human nutrition. Its suggested relationships to rickets: A. F. Hess.

Preliminary observations on the relation of bacteria to experimental scurvy in guinea-pigs: M. H. Givens and G. L. Hoffman, Western Pennsylvania Hospital, Pittsburgh.

Further studies on the use of water soluble B in the treatment of infant malnutrition: Walter H. Eddy, New York City.

Is fibrinogen formed in the liver? A. P. Mathews, University of Cincinnati.

Anaphylactoid phenomena: Paul J. Hanzlik and Howard T. Karsner, Western Reserve University.

Further studies in experimental excitation of infections of the throat by chilling the body surface: Stuart Mudd, Samuel B. Grant and Alfred Goldman, Harvard Medical School.

Some observations on dark adaptation of the peripheral retina: M. Dresbach, John E. Sutton, Jr. and S. R. Burlage, Albany Medical College.

Paradoxical pupil dilation following lesions of afferent paths: Joseph Bryne, Fordham University.

The interpretation of certain muscle phenomena in terms of "all or none": T. K. T. Krause, University of Pittsburgh.

Heat production in the Cardia Sphincter of the turtle: C. D. Snyder, Johns Hopkins Medical School.

Some remarks on catalase: Thos. C. Burnett, University of California.

Adrenal secretion in pain and asphyxia: W. B. Cannon, Harvard Medical School.

The cardio-respiratory metabolic function: R. G. Pearce, Akron, Ohio.

Character of the sympathetic innervation of the retractor muscle in the dog: C. W. Edmunds, University of Michigan.

A comparison of the physiological effects of Alpha and Beta rays: Alfred C. Redfield, University of Toronto.

On the origin of the muscular tremors, clonic and tonic spasms, in parathyroid tetany: A. B. LUCKHARDT, M. SHERMAN and W. B. SERBIN, University of Chicago.

The rôle of catalase in the organism: W. E. BURGE, University of Illinois.

Significance of concentration as applied to substances in the blood plasma: R. T. WOODYATT.

Alkaloid diffusion in physical and biological systems: G. H. A. CLOWES and A. L. WALTERS.

The adjustment to the barometer of the hemato-respiratory functions in man: YANDELL HENDERSON and H. W. HAGGARD.

A convenient permanent urease preparation: OTTO FOLIN.

Relation of anesthesia to respiration: SHIRO TASHIRO.

New methods for the study of blood pressure in man and in the dog. a. Continuous systolic tracings in man. b. Indirect determination of blood pressure in the unanesthetized dog: ALFRED C. KOLLS, Washington University, St. Louis.

Determination of the circulation time in man and animals: A. S. LOEVENHART, BENJ. H. SCHLOMOVITZ and E. G. SEYBOLD, University of Wisconsin.

The critical level as blood pressure falls: WALTER B. CANNON and MCKEEN CATTELL, Harvard Medical School.

Basal metabolism during traumatic shock: JOSEPH C. AUB and DONALD CUNNINGHAM, Harvard Medical School.

The effects of some anesthetics in shock: MCKEEN CATTELL, Harvard Medical School.

Acidosis as a criterion of shock: B. RAYMOND, University of Chicago.

The blood in clinical shock: G. C. WEIL and C. C. GUTHRIE, University of Pittsburgh.

The rôle of the vagi and the splanchnic nerves in the genesis of shock from abdominal operations: A. C. IVY, Loyola University.

Microdissection studies on the fertilization of the star fish egg: ROBERT CHAMBERS, Cornell University Medical College.

Further studies on the action of Acacia and associated colloids: T. K. T. KRUSE, University of Pittsburgh.

Studies on the responses of the circulation to low oxygen tension. II. The electrocardiogram during extreme oxygen want: CHAS. W. GREENE and NEWTON C. GILBERT, Medical Research Laboratory, Air Service.

The influence of low oxygen tensions on venous blood pressure in man: EDWARD C. SCHNEIDER, Wesleyan University.

Observations on the pathological physiology of chronic pulmonary emphysema: R. W. SCOTT, Western Reserve Medical School.

Electron tube amplification with the string galvanometer: ALEXANDER FORBES and CATHERINE THACHER, Harvard Medical School.

Observations on the capillary blood pressure in man with demonstration of apparatus: D. R. HOOKER and C. S. DANZER, Johns Hopkins Medical School.

Some cardiac and vascular reactions to small hemorrhages: WALTER J. MEEK and J. A. E. EYSTER, University of Wisconsin.

Time relations of the heart cycle as shown by the carotid pulse: W. P. LOMBARD and OTIS M. COPE, University of Michigan.

Further experiments on the effect of warming and cooling the sino-auricular node in the mammalian heart: BENJ. H. SCHLOMOVITZ, University of Wisconsin.

Studies on catalase: R. J. SEYMOUR, Ohio State University, Columbus.

Further results on the physics of sphygmography: A. M. BLEILE and CLYDE BROOKS, Ohio State University.

Effects of breathing dry and moist air: E. P. LYON and ESTHER GREISHEIMER, University of Minnesota.

Vascular reactions to epinephrine in solutions of various concentrations of hydrogen ions: C. D. SNYDER and W. A. CAMPBELL, JR.

The effect of the subcutaneous injection of adrenalin chloride on blood pressure, pulse rate and the basal metabolic rate in man: WALTER M. BOOTHBY and IRENE SANDIFORD, Mayo Clinic.

Removal of the duodenum: F. C. MANN, The Mayo Clinic.

The experimental production of edema as related to protein deficiency: EMMA KOHMAN, University of Chicago.

Susceptible and resistant phases of the dividing sea-urchin egg when subjected to various lipoid-solvents especially the higher alcohols: F. M. BALDWIN, Iowa State College.

Effect of glutamine production on urinary nitrogen: CARL P. SHERWIN, M. WOLF and W. WOLF, Fordham University.

The excretion of a red pigment in the sweat by man: M. H. GIVENS, V. L. ANDREWS and H. B. MCCLUGAGE, Western Pennsylvania Hospital, Pittsburgh, Pa.

Urochrome excretion as influenced by diet: Carl Pelkan, University of California.

The chemistry of gar roe: Chas. W. Greene and Erwin E. Nelson, University of Missouri.

On the protection against eosin hemolysis afforded by certain substances: C. L. A. Schmidt and C. F. Norman.

PAPERS READ BY TITLE

The regeneration of the vagus nerve in the dog: F. T. Rogers, Marquette School of Medicine.

The action of prostatic extracts on the tonicity and contractions of isolated genitourinary organs: D. I. Macht and S. Matsumoto, Johns Hopkins Medical School.

Nervous regulation of respiration: F. H. Scott and C. C. Gault, University of Minnesota.

Recent developments in the field of industrial hygiene: A. H. Ryan, Waterbury, Conn.

The influence of internal secretions on blood pressure and the formation of bile: Ardrey W. Downs, McGill University.

The physiology of reproduction in the opossum: Carl Hartman, University of Texas.

A study of the effect of massage and electrical treatment on denervated mammalian muscle: F. A. Hartman and W. E. Blatz, University of Buffalo.

Function of the Coxal plates of amphipoda: John Tait, University of Toronto.

Keratin: John Tait, University of Toronto.

The effect of pituitary extracts on the absorption of water from the intestine: M. H. Rees, University of South Dakota.

Observations on the thyroid: Walter B. Cannon and Phillip E. Smith, Harvard Medical School.

The effect of pituitary feeding on egg production in chickens: Sutherland Simpson, Cornell University.

The theory of physiological overstrain of the pancreas as the cause of diabetes: A. J. Carlson and V. W. Jensen, University of Chicago.

The nature of the light producing reaction of luminous animals: E. Newton Harvey.

Observations on volume-flow of blood: Robert Gesell, University of California.

Blood flow measurements through the hands: N. B. Taylor, University of Toronto.

On the reality of nerve energy: D. Fraser Harris, University of Toronto.

The respiratory quotient and its uncertainties: J. A. Fries, State College, Pennsylvania.

The subcortical tract for masticatory rhythm: F. R. Miller, Western University.

DEMONSTRATIONS

Apparatus for gas analysis, etc.: J. J. R. Macleod, University of Toronto.

A method for determining the rate of oxygen absorption by blood: W. S. McElroy and C. C. Guthrie, University of Pittsburgh.

A non-leakable and quantitative volume change recorder: Robert Gesell, University of California.

Foods and food substitutes used in western Russia, and in parts of Poland during the winter 1918–1919: A. J. Carlson, University of Chicago.

A convenient stop cock needle cannula: Paul J. Hanzlik, Western Reserve University.

Demonstration of method for determining the circulation time: A. S. Loevenhart, Benj. H. Schlomovitz and E. G. Seybold, University of Wisconsin.

Blood pressure apparatus. (*a*) For continuous systolic tracing in man; (*b*) for indirect determinations of pressure in the unanesthetized dog: Alfred C. Kolls, Washington University, St. Louis.

The scientific papers called forth spirited discussion, especially the papers on the secretion of epinephrin by Drs. Stewart and Rogoff, on the one hand, and Dr. Cannon, on the other; and the papers by Dr. McCollum and by Dr. Hess, on the problem of nutritional diseases.

The program, as a whole, was very strong and general satisfaction was expressed at the evidence of promptness with which American physiologists have returned to their scientific investigations.

The executive committee of the federation voted, the Council of the Physiological Society concurring, to hold the next annual meeting at Chicago, in conjunction with the American Association for the Advancement of Science.

Chas. W. Greene,
Secretary

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